Space Weather Forecast

Issued on Wednesday 5 February 2025 at 13:21 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of glancing blows from two coronal mass ejections. Further Moderate-class flares expected, slight chance of a Strong-class flare.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate over the past 24 hours, with isolated Moderate-class flares, most of which originated from the complex spot spanning from centre disc to the northwest. There are eight active regions on the Earth-facing disc. The largest individual region within the aforementioned cluster is at the rear, with most of the activity arising from that portion. It has two delta configurations within its complex and compact intermediate spot groups, with vertical shear evident, though is now beginning a slight decaying and splitting trend. The remaining spots are all smaller and simple.

No Earth directed coronal mass ejections were observed in available imagery in the past 24 hours. Though there is a chance of a glancing blow from a southwest filament eruption from early 05 Feb.

Solar Wind / Geomagnetic Activity: Solar winds, showed a generally flat trend ranging between slightly elevated and slow-ambient. The Interplanetary Magnetic Field was weak. The north-south component was largely positive and weak. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is forecast, with Moderate-class flares expected at times and a slight chance of rising to High, with isolated X-class flares, primarily from the regions in the north spanning centre disc into the western hemisphere.

Solar Wind / Geomagnetic Activity: Two coronal mass ejections feature in the forecast, one from 02 Feb which may give a glancing blow with Earth on the morning of day 2 (06 Feb). Another from a filament eruption in the southwest early on 05 Feb, may possibly give a glancing blow late day 3 or day 4 (07/08 Feb). Both are low confidence. The potential for further coronal mass ejections and hidden transients is currently elevated.

Solar wind speeds are expected to continue generally at or near background levels for much of the period, but may return to slightly elevated or elevated levels should any coronal mass ejections

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arrive. A coronal hole high speed stream is expected to most likely arrive at Earth beyond the current forecast period, although there is a chance it may become geoeffective later day 4 (08 Feb).

Generally Quiet (Kp 0-2) geomagnetic activity is expected for much of the period. However, there is a chance following any potential coronal mass ejection arrival early day 2 then late day 3 into day 4, of seeing activity temporarily increase to G1-G2/Minor-Moderate Geomagnetic Storm intervals (Kp 5-6). Also, later day 4 there is a slight chance for G1/Minor Storm conditions to develop should the next high speed stream arrive.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increasing risk of a rise through this period as the cluster of sunspots in the north move further into the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	40	20	40
Strong	G3	No	1	5	1	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	80	80	80	80
Very Active	R3-R5 (X Class)	No	20	20	20	20

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	25	30	30
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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